Water

P.E.I.'s MOST PRECIOUS RESOURCE

ST. PETERS BAY COMPLEX

WATERSHED ACTIVITIES

SURFACE WATER PROGRAM

MARCH 1990

THE CANADA–PRINCE EDWARD ISLAND
WATER MANAGEMENT AGREEMENT

Environment Canada Environnement Canada

Prince Edward Island
Department of the Environment

ST. PETERS BAY COMPLEX

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THE CANADA – PRINCE EDWARD ISLAND
WATER MANAGEMENT AGREEMENT

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P.E.I. Department of the Environment
Fish and Wildlife Branch

SURFACE WATER PROGRAM

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PREFACE

This report is one of a series produced as a result of the Canada - Prince Edward Island Water Management Agreement. The work was performed as part of the Watershed Inventory Project under the Surface Water Program.

It was initiated in order to gain a better understanding of the activities which may impact on the quality and quantity of surface waters drained by the Morell, Marie, Midgell and St. Peters Rivers into St. Peters Bay.

The report is intended to be used in conjunction with the report entitled "Activities Affecting Surface Water Resources - A General Overview" and the book of "St. Peters Bay Watershed Inventory Maps" which is maintained on file at Inland Waters Directorate, Environment Canada in Dartmouth, Nova Scotia. All references to maps in this report are to the atlas.

Mapping was performed on the 1:50,000 N.T.S. topographical series using the Universal Transverse Mercator (U.T.M.) grid system to the nearest one hundred (100) metres for point data. Non-point (polygon) data is also mapped where applicable. This technique is easily transferable to the Geographical Information System (G.I.S.) which provides for updating and manipulation of the data.

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1.0 INTRODUCTION

In November 1987, the Canada - Prince Edward Island Water Management Agreement was signed. The Agreement focuses upon several areas including groundwater contamination, surface water degradation and estuarine eutrophication. Of these, the Watershed Inventory Project, as part of the Surface Water Program, has been designed to identify current and future users of surface water and to document resource conflicts within twelve watersheds across the province. The St. Peters Bay Watershed Complex (Figure 1.1) was identified as an area of study for the project.

2.0 GENERAL CHARACTERISTICS OF THE ST. PETERS BAY WATERSHED COMPLEX

2.1 Physiography

The St. Peters Bay Watershed Complex is located in the northwest section of Kings County, P.E.I. The Morell, Marie, Midgell and St. Peters Rivers each drain a number of tributaries before emptying into St. Peters Bay which then opens to the Gulf of St. Lawrence.

The several glaciers which at one time covered Prince Edward Island have caused a gently undulating terrain across much of the province. Average elevation is less than sixty-one (61) metres above sea level. The St. Peters Bay Watershed Complex encompasses a rolling section of the Island. Only the most southern part of the watershed is very hilly, with maximum elevations on a few crests exceeding seventy-seven (77) metres.

The St. Peters Bay area is largely rural with a few small villages and scattered farms. As is the case with the Island as a whole, the St. Peters Bay Watershed Complex is traversed by an extensive network of roads. Many of these roads are unpaved and are not kept open during the winter months.

A physiographic comparison of Prince Edward Island and the St. Peters Bay Watershed Complex (Figure 2.1) reveals that the watershed is more wooded on the whole than the Island but the individual subwatersheds range from about forty-nine (49) to seventy-six (76) percent forested (Taylor, 1988).

The watershed drains a landbase of close to two hundred and ninety-one square kilometres (290.08 km^2). The total length of the four major Rivers and their tributaries is approximately two hundred and thirty-one kilometres (230.50 km).

Figure 1.1 St. Peters Bay Watershed Complex

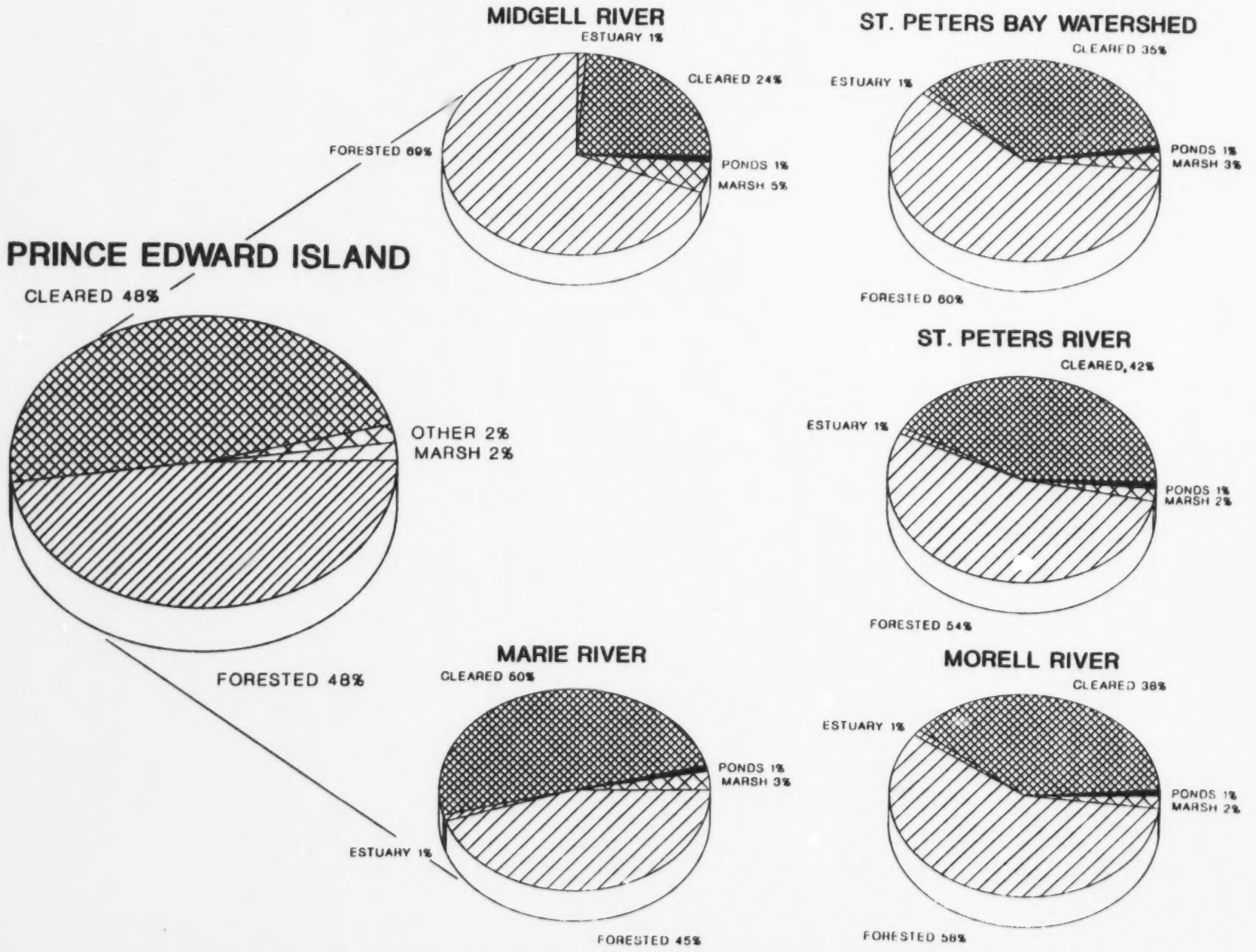

Figure 2.1 Physiographic Comparison of Prince Edward Island and the St. Peters Bay Watershed Complex

2.2 Soils

Prince Edward Island's podzol soils, formed mainly from the weathering of sandstone and the deposition of glacial till, are generally stone-free, sandy and permeable. The St. Peters Bay Watershed Complex is composed of varying amounts of Class 0, 2S, 3S, 3T, 4S, 4T, 5^{S}_{W}, 5W, 7I, 7S, 7W and 7^{S}_{W} soils. Approximately forty percent (40%) of the soils are Class 2, twenty percent (20%) Class 3, ten percent (10%) Class 4, twenty-five percent (25%) Class 5 and five percent (5%) Class 7 and Class 0 combined (Canada Land Inventory, 1968).

3.0 AGRICULTURAL OPERATIONS

Agriculture forms a major part of Prince Edward Island's economy. Many parts of the St. Peters Bay Watershed Complex's terrain are well-suited for livestock operations. There are a total of sixty-four (64) livestock operations located throughout (Maps 11L/2 and 11L/7). Crop production is also evident with the major crops being potatoes, hay, oats, barley and clover.

3.1 Dairy Operations

There are twenty-six (26) dairy operations in the watershed (Figure 3.1). Each operation contains at least thirty (30) or more head (30 milkers and 30 feeders) of cattle (Younie, 1989).

3.2 Beef Operations

Nineteen beef cattle operations (Figure 3.1) with fifty (50) or more head (50 cattle plus 50 feeders) are present (Younie, 1989).

3.3 Hog Operations

Eleven hog operations (Figure 3.1) are situated within the watershed's boundaries each having an annual production of eight hundred (800) or more animals (Younie, 1989). Since hogs are normally housed indoors the only threats to surface water quality are as a result of the improper storage and disposal of manure.

3.4 Poultry Operations

There is one large scale poultry operation (Figure 3.1) located at Greenwich which is found in the St. Peters River subwatershed (Younie, 1989).

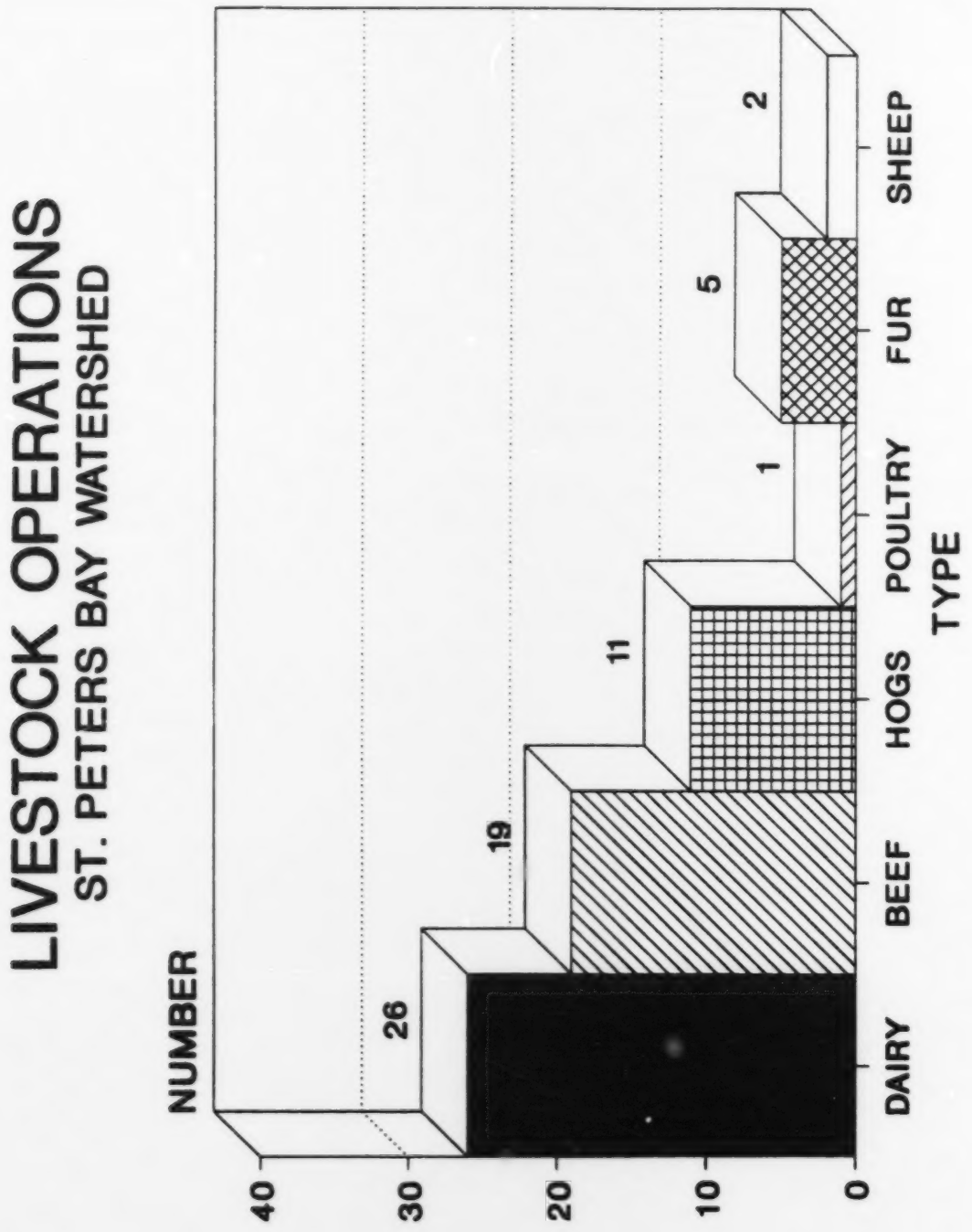

Figure 3.1 Livestock Operations Located Within the St. Peters Bay Watershed Complex

3.5 Sheep Operations

There are two major sheep farms (Figure 3.1) in the watershed (Younie, 1989).

3.6 Fur Ranches

There are five fur ranches of significant size (Figure 3.1) located within the watershed (Younie, 1989). Three of the operations contain only foxes while one is a mink ranch and the other is a combination mink-fox farm.

3.7 Stock Watering

Most livestock on Prince Edward Island are watered using groundwater piped into troughs (Murphy, S., 1988). However, there have been some instances noted in which animals were observed drinking from streams traversing the pastures (refer to Section 11.2). This leads not only to destabilization of the stream banks and siltation but also to bacterial contamination of the water.

3.8 Irrigation

The Prince Edward Island Department of Agriculture does not keep specific records on irrigation occurring within the province. Water used for irrigation generally comes from a surface water source such as a farm pond or stream. In unusually dry years, such as 1987, there are probably more farmers than usual who had to irrigate their crops (Clough, 1988). Water withdrawal was noted to occur from Pine Brook which is located within the St. Peters River subwatershed (Map 11L/7). This practice may affect the amount of water available for users in downstream locations. Therefore, a system should be set up in order to monitor the resource.

3.9 Dead Stock Burial

There are not any known dead stock burial sites in the watershed. Farmers either pay a service fee to have their stock discarded at an approved disposal site or they can sell their dead animals to Maritime Pet Foods. Both are located outside of the watershed. They can also dispose of them on their own land (which is the most likely scenario).

3.10 Erosion Control Projects

There are two erosion control projects located within the St. Peters Bay Watershed Complex (Map 11L/7). Both are tile drainage projects (Pharo, 1989). These have enabled farmers to increase the productivity of low class agricultural lands

(DeHaan, 1989).

4.0 FISH AND WILDLIFE RESOURCES

Fish and wildlife resources are important to both residents and tourists alike on Prince Edward Island in terms of the recreational and economic benefits they provide. Fish and wildlife on P.E.I. are dependent upon surface water resources either for primary habitat or as a source of drinking water.

4.1 Angling Areas

There are numerous angling sites located along the rivers (Maps 11L/2, 11L/7 and 11L/8) including five listed in Angling on Prince Edward Island (P.E.I. Department of Tourism and Parks, 1988). The entire watershed is described as a good angling site (MacIntyre, 1989).

4.2 Hunting Areas

The entire St. Peters Bay Watershed Complex is known to be an excellent area for hunting waterfowl (MacIntyre, 1989). The fields of crops, especially grain, provide an abundant supply of food for waterfowl during their spring and fall migrations. The numerous woodlots and hedgerows separating the agricultural fields provide suitable habitat for such upland game species as; pheasant, snowshoe hare, ruffed grouse, Hungarian partridge, snipe and woodcock (Maps 11L/2, 11L/7 and 11L/8). Since wildlife is known to be migratory, in response to habitat requirements and food availability, their boundaries are not static from year-to-year.

4.3 Trapping Areas

As with hunting areas, the trapping areas (Maps 11L/2, 11L/7 and 11L/8) do not have consistent boundaries from year-to-year (MacIntyre, 1989). They are dependent both upon the movement of animals and the preferences of trappers. Some of the species trapped include muskrat, beaver, mink and snowshoe hare. Trapper use of the area is related to the fur market conditions during the season.

4.4 Beaver Activity Areas

Beaver dams in streams and rivers result in the creation of flowages. These new areas provide habitat for waterfowl other other furbearing mammals such as mink and muskrat. The effects of beaver dams and the resulting flowages can also be viewed negatively as they often block the passage of trout, salmon and other finfish to essential spawning and feeding areas.

There are fifty-eight (58) known active beaver areas within the watershed (Dibblee, 1989). This figure is likely to change from year-to-year as many dams are viewed as obstructions and are often removed. The total number also does not include abandoned and breached dams.

Beaver dams are actively removed from sections of the Morell River which is continually monitored for its salmon population. These areas include the East Branch of the Morell River downstream from the Everglades and the West Branch of the River below Mooneys Pond and downstream from MacAuleys Pond (Map 11L/7), (Guignon, 1988).

5.0 RECREATIONAL ACTIVITIES

Surface water and some recreational activities go hand-in-hand (swimming and boating). Other activities (hiking and skiing) are often enjoyed in close proximity to streams and rivers. Similarly, major recreational facilities (provincial parks and campgrounds) are generally situated adjacent to Island surface water resources.

5.1 Provincial Parks / Private Campgrounds

There is one provincial park located within the watershed (Map 11L/7). St. Peters Provincial Park is located just outside of the Village of St. Peters and offers picnic, day-use and campsite facilities.

There was another park (Marie Provincial Park), located on the Marie River near the Village of Marie, but it is no longer maintained by the province. However, it is still used for day trips and picnics.

Eleven private accommodation's facilities are located within the St. Peters Bay Watershed Complex's boundaries. Various activities are available at a few of the locations including swimming and boating (P.E.I. Department of Tourism and Parks, 1989).

5.2 Swimming Areas

Generally, people will swim where they desire. In P.E.I. many of the best swimming areas are coastal. This excludes much of the St. Peters Bay Watershed Complex.

The only organized swimming activities on the Island occur through the Canadian Red Cross Society which does not conduct swimming events in the St. Peters Bay area (MacLean, 1989). Ponds, areas near bridges and the wider sections of the

rivers would be those most concentrated with swimmers.

5.3 Boating / Canoeing Areas

Despite the attractiveness of the St. Peters Bay area for boating and canoeing, launching sites are limited. Many larger boats enter St. Peters Bay at Red Head Harbour via a public launching ramp. There are also boat launching ramps located at the Highway #2 Bridges in Morell, Marie, Midgell and St. Peters and at the Ducks Unlimited site at Martinvale (Map 11L/7).

The Prince Edward Island Recreational Canoeing Association (PEIRCA) is able to provide additional information on various canoeing routes throughout the province but does not offer any organized trips (P.E.I. Department of Tourism and Parks, n.d.). The Morell River is suitable for canoeing from the bridge at Highway #320 (Grants Bridge) downstream to the Morell Bridge on Route #2, a distance of some twelve kilometres (Map 11L/7). Canoe rentals are not available within the watershed.

Boardsailing is gaining popularity on P.E.I. St. Peters Bay is fairly sheltered and provides most of the windsurfing opportunities. The four major Rivers lack significantly large open areas and are, therefore, not suitable for boardsailing.

5.4 Hiking / Cross-Country Skiing / Snowshoeing

For the nature-buff or recreational enthusiast a good method in which to see an area is on foot either by hiking, cross-country skiing or snowshoeing. In this way, people can go at their own pace, perhaps photographing what catches their eye or just enjoying the great outdoors.

There are no organized hiking or cross-country trails in the watershed although rail lines and the several woods' roads and unpaved roads are well-suited for this purpose.

Snowshoeing activities may be undertaken anywhere within the watershed. However, the areas utilized for hiking and/or cross-country skiing most likely have the highest use for snowshoers as well.

5.5 Snowmobiling / Horseback Riding

There are not any snowmobiling clubs in the watershed and therefore no organized excursions. Snowmobilers are often observed riding through fields and along woods' and seasonal roads.

There are no commercial horseback riding operations. However, horses have been observed in several pastures and it is assumed that trail riding occurs on a limited scale.

5.6 Unplowed (Seasonal / Scenic Heritage) Roads

Many local and unpaved roads are not open for vehicular traffic during the winter (Maps 11L/2, 11L/7 and 11L/8). The relative abundance of these roads provides additional venues for winter recreational activities such as cross-country skiing, snowshoeing and snowmobiling. Often not well travelled even during the warmer months, the roads may further supply recreational opportunities for hiking, cycling and horseback riding.

Several roads across the Island have been designated as Scenic Heritage roads as a result of their natural and historical significance. There have not been any roads so designated within the St. Peters Bay Watershed (Horne et. al., 1988).

6.0 FISHERIES OPERATIONS

The fishing industry is very important to the economy of Prince Edward Island. All of the province's major watersheds have an estuarial component which supports a fishery to some extent. The value of the fish and shellfish species landed within the St. Peters Bay Watershed Complex was over one million two hundred thousand dollars ($1,206,450) in 1987 (Figure 6.1). All finfish and shellfish harvesting can be placed into three general categories, namely; licensed commercial, non-licensed commercial and recreational and finfish aquaculture.

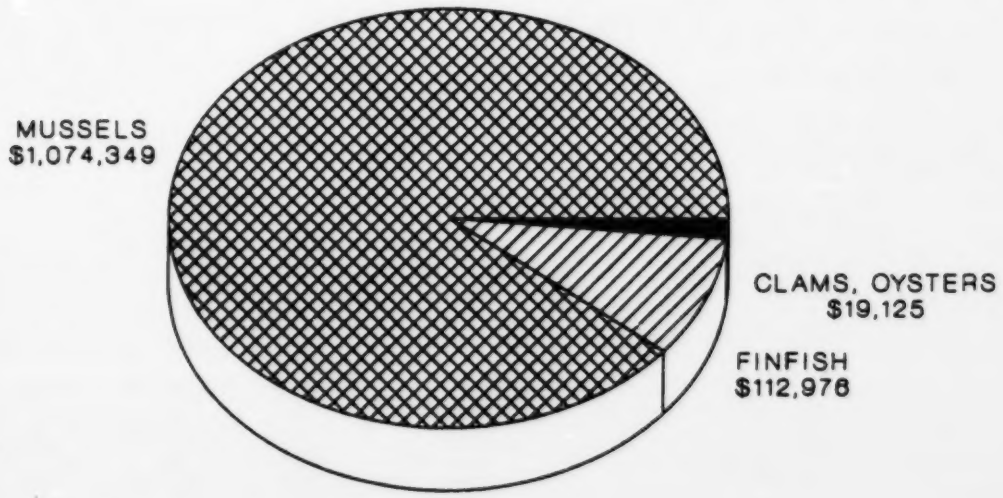

Figure 6.1 1987 Fish/Shellfish Landings Within the St. Peters Bay Watershed Complex

6.1 Licensed Commercial

Some areas of the watershed are classed as public fishing domain. As such, there are no suspended or ground shellfish leases and any fisherman can remove shellfish in season. Other areas are specific leased areas or zones and can be fished only by the lease owner. There are fifty-eight (58) mussel leases and two finfish leases located in the Bay (Map 11L/7), (Small, 1989).

The primary public oyster and quahog harvesting areas are indicated on Map 11L/7. Soft-shelled clams are harvested in the St. Peters Bay on both a commercial and non-commercial basis. The areas of greatest shellfish concentrations have been identified by Department of Fisheries and Oceans personnel (Map 11L/7).

The watershed is open to eel netting annually from August 15 to November 30 and to eel spearing on a year round basis. Smelt catches are regulated by season and are monitored by Department of Fisheries and Oceans staff. Box, gill and bag nets are used to trap smelt during the annual season (October to February). Silverside are harvested from a small cove located near the Village of St. Peters Harbour. Gaspereau are caught at MacDonalds Pond and Indian Bridge (Matheson, 1988).

6.2 Non-Licensed Commercial / Recreational

Trout, salmon, mackerel and smelt are harvested in season for personal consumption. Quahogs, clams and mussels are also harvested from public areas.

Despite the closure of a section of the St Peters River and estuary due to bacteriological contamination (Map 11L/7), the watershed currently supports significant non-licensed commercial as well as recreational finfish and shellfish harvests. Any shellfish which are removed from the contaminated areas, must be transferred to unpolluted areas for flushing (a period of three to four weeks). However, people who harvest shellfish from contaminated areas must first obtain a conditional permit from the Department of Fisheries and Oceans.

6.3 Aquaculture Operations

There are two finfish aquaculture sites located within the watershed (Map 11L/7). One is located near Red Head Wharf where 100 to 300 rainbow trout are kept in a groundwater-sourced closed system during the winter and are moved into St. Peters Bay after the ice has broken up. The second operation is a sea cage set-up located in St. Peters Bay containing about

fifteen hundred (1500) Atlantic salmon (Murphy, L., 1989).

St. Peters Bay is one of the most important mussel producing areas in the province. Currently, there are fifty-eight (58) mussel leases assigned to the Bay. Some of these are used for the production of market-sized mussels. However, the majority of the leases are used for the collection of spat and the growth of seed mussels. The seed mussels are transferred to the warmer waters of several eastern P.E.I. rivers where they are then grown to market size (Judson, 1989). The economic importance of St. Peters Bay as an "infirmary" is significant although the exact value of the seed mussels has not been calculated and is not included in Figure 6.1.

7.0 INDUSTRIAL OPERATIONS

Many of the industrial operations located on Prince Edward Island have an effect on surface water resources in one way or another. Some discharge both treated and untreated wastes directly into streams and rivers while others allow for the seepage of pollutants to surface or groundwater sources. Some industrial operations require a surface water or groundwater source for use in their processes.

7.1 Stormwater Drainage

A small stormwater drainage system in Morell discharges into a small unnamed tributary of the Morell River which is located just north of the Village (Rossiter, 1989). The Village of St. Peters also has a small system which empties into the Bay on both sides of the Highway #2 Bridge.

7.2 Sewage Lagoons

The two sewage holding lagoons located within the St. Peters Bay Watershed Complex are located in Morell and St. Peters (Map 11L/7). The Morell system is unmonitored while the St. Peters lagoon serves one hundred (100) Single Family Equivalent Units (Hogan, 1988). The discharge from the St. Peters lagoon enters into St. Peters River and flows into the Bay (Reeves, 1989).

7.3 Food Processing Operations

There are three food processing operations located within the watershed's boundaries. Babineau Fisheries operates a cannery at Red Head Wharf which is located near the mouth of St. Peters Bay. International Seafoods Limited operates a quick freeze, salt fish and pickling plant in Morell (McAdam, 1989) and Game Bird Wild Rice harvests a crop on Pisquid Pond (Map 11L/7).

7.4 Abandoned, Active and Unapproved Dump Sites

During 1982-83, the P.E.I. Department of Community and Cultural Affairs, in conjunction with Environment Canada, performed a study in which abandoned, active and unapproved waste disposal sites on Prince Edward Island were located and inspected (Water Resources Section, 1983). Of prime concern during the Inventory was the potential for groundwater contamination. A total of twenty (20) sites were identified within the St. Peters Bay Watershed Complex (Map 11L/7).

As part of the inventory a scoring system was used to rate and priorize (Priority I, II and III) each site on the basis of actual and potential environmental effects. Priority I sites were rated as being most hazardous to the environment; Priority II dumps were less hazardous; while Priority III sites were generally very small discriminate sites which were not considered to be environmentally hazardous. Evaluation of the abandoned sites revealed one Priority I, three Priority II and sixteen Priority III sites.

The Air and Solid Wastes Branch of the P.E.I. Department of the Environment has also identified two active approved dump sites. One is a container site located on the Peakes Road while the other is a landfill outside of the Village of St. Peters (Map 11L/7). The latter site will most likely be closed in the near future as it is a cause for concern (Curley, 1989). Waste from the Village of Morell is trucked to a disposal site outside of the watershed. The Village of St. Peters disposes of most of its garbage to the Cardigan landfill site.

There is no established program for hazardous waste disposal on Prince Edward Island (Curley, 1988). However, the Air and Solid Wastes Branch cooperates with their federal counterparts in controlling toxic waste disposal. For example, asbestos, which has been removed from buildings is double-bagged and dumped at landfill sites. Agricultural pesticides are sometimes left at dumpsites illegally. Since it is difficult to regulate such practices, remnant chemicals could become a potential hazard to both surface and groundwater resources.

The only other major form of toxic wastes on P.E.I. are polychlorinated biphenols (PCB's). As these compounds do not break down under normal conditions, they must be stored until they can be transported to a proper disposal site (located off-Island). There are no registered PCB users or PCB storage sites located in the watershed (Guardian - Patriot, 1988). Hazardous materials are not generated in significant amounts to cause any problems to its surface water resources.

7.5 Excavation Pits

Scattered throughout Prince Edward Island are numerous excavation pits used for the private and commercial removal of sandstone, and to lesser amounts, gravel and sand. There are four registered active excavation pits located within the area (Map 11L/7). Records are not kept concerning the quantity of material removed from the individual pits and there are other pits for which permits have not been obtained. Records are also not maintained concerning the number of non-operational or abandoned pits (Murphy, C., 1988).

7.6 Salt / Sand Storage Locations

The P.E.I. Department of Transportation and Public Works maintains a number of salt/sand storage areas across the Island. At these temporary sites, the salt and sand is stored directly on the ground with little or no site preparation. Often, the locations of these secondary sites change thereby yielding both abandoned and active sites. There are two active salt/sand storage sites, one at Morell East and the other at St. Teresa (Map 11L/7).

7.7 Snow Disposal Sites

Because of the small size of the communities located within the St. Peters Bay Watershed Complex there are no major problems with snow accumulation on streets (Rossiter, Ryan, 1989). Snow is plowed either into the ditch or the nearest open field or lot. Therefore, the effects of this activity on surface water resources are minimal.

7.8 Additional Industrial Activities

A number of sawmills are operated as small businesses within the watershed. Some of the mills are mobile (usually powered by tractors) and will process wood at the woodlot while others are fixed and are powered by water, generators or electricity. There are three sawmills registered with the P.E.I. Department of Industry Directory that are located within the watershed (P.E.I. Development Agency, 1986). Sawmill waste can increase the biological oxygen demand of waterways and, in some cases, cause increases in the acidity (Godfrey, 1989).

8.0 ALTERATIONS OF NATURAL FEATURES OF WATERWAYS

Individuals or groups wishing to alter a water system directly or indirectly to improve its recreational potential, to provide a reservoir for agricultural purposes or fire protection, or to construct a stream crossing, must seek approval from the Water Resources Branch of the P.E.I.

Department of the Environment (Environmental Protection Act, Sections 10 and 11).

8.1 Application Process and Requirements

Alteration applications are subject to government control under the P.E.I. Environmental Protection Act (Section 10) and the Canada Fisheries Act (Chapter F-14, Section 20). Before requests are given final approval by the Head of the Watercourse Alteration Advisory Committee, they are reviewed by several federal/provincial government and private agencies. Once approval is granted, inspections are carried out to ensure that the recommendations of the Committee are being followed.

Application considerations include the following criteria: the well-being of the fisheries resource; possible changes in water quality; stream-side cutting leading to loss of essential food and cover for wildlife; and the effects of the alteration on other types of wildlife.

Types of alterations include; installation of dams and/or fishways, bypass pond construction, roadway culvert installation, rock gabion installation and the infilling of marshes. Infilling applications, most often, are rejected since the practice results in a loss of wildlife habitat.

Since P.E.I. soils are highly susceptible to erosion, proponents who alter waterways must undertake erosion control measures throughout the construction process.

8.2 Dam Inspections

Most of the twenty-two (22) dams located in the watershed (Maps 11L/2 and 11L/7) were inspected. Thirteen are in the Morell River subwatershed, five in the St. Peters River subwatershed, three in the Midgell River subwatershed and one in the Marie River subwatershed. Descriptions of the dams can be found in Appendix A. Some were found to constitute a barrier to fish passage. The reasons for this were due to the design of the dams, breaching, breakdown or a build-up of debris within the waterways (refer to section 11.3).

There are, in some cases, repairs made to the design flaws of roadway culverts which then permit the passage of fish through the structures. This involves the installation of baffles or back flow devices which then allows for decreased water flows and increased depths within the culverts.

8.3 Fishways

On Prince Edward Island, whenever an alteration is made to a waterway, the continued passage of fish must be ensured

[Canada Fisheries Act, Chapter F-14, Section 20, (1)]. This involves, in some cases, the construction of a fishway. Various fishway designs are available with the type constructed dependent upon the species of fish to be passed and the water level fluctuations within the impoundment.

Six fishways were identified and field checked within the St. Peters Bay Watershed Complex (Map 11L/7). Five were pool-and-weir (Martinvale Pond, MacDonalds Pond, Mooneys Pond, Marie River Ducks Unlimited Project and Sandy Cape Marsh) while the other, located at Leards Pond near Riverton, is a thirteen step vertical slot fishway. All were found to be in good condition except for the two step pool-and-weir structure located at the Marie site (refer to section 11.3.7). The structure at Mooneys Pond is currently under construction, will be unique in that although it will have the capability to pass fish it will not be operational. Instead, since the Pond is to be used for rearing fish, all fish will be trapped and transported around the Pond which will have complete barriers at both ends.

8.4 Road - Stream Intersections

The P.E.I. Department of Transportation and Public Works maintains a reference map which provides an up-to-date record of all major highway structures, that is, those over 1.2 metres in diameter, within the province. The St. Peters Bay Watershed Complex contains thirty-seven (37) such structures (Maps 11L/2, 11L/7 and 11L/8).

The Watershed Inventory Project also identified fifty-six (56) additional road-stream intersections which are not kept on file at the Department of Transportation and Public Works (Maps 11L/2, 11L/7 and 11L/8). These areas were located via 1:50,000 N.T.S. maps but not all have been field checked due to time and manpower constraints.

8.5 Rail - Stream Intersections

Earlier this century railroads on Prince Edward Island were a vital component in the transportation of goods across the Island. However, due to increased rail costs and more efficient trucking methods, its importance rapidly decreased. As a result all of the lines across the province were abandoned effective January 1990.

After the line is abandoned, CN Real Estate will contract out for the removal of the ties and rails. Crossing structures are not usually removed since they are often more useful if left in place. If the lines are removed, regular inspections of the crossings will cease and problems relating to the successful passage of fish may result.

There are eleven (11) major railway - stream intersections in the watershed (Maps 11L/2 and 11L/7) constructed of an assortment of materials (wood, brick, iron and concrete).

9.0 WETLANDS

Wetlands include salt marshes, intertidal flats, bogs, freshwater marshes, swamps and ponds. They are important for many reasons (Canadian Wildlife Service, n.d.):

1. as wildlife habitat;
2. act as natural filters;
3. bind pollutants thereby slowing the eutrophication process;
4. reduce flooding by acting as reservoirs; and
5. recharge the groundwater supplies.

During 1983 - 84 any wetlands over 0.25 hectares on Prince Edward Island were inventoried. The objective of the program was to provide information on the classification, size, distribution and wildlife value of P.E.I. wetlands.

9.1 Freshwater Wetlands

All freshwater wetlands within Prince Edward Island were identified and given a wildlife value based on a wide array of parameters. They received a score between 36 and 108 with a score of 60+ indicating generally more productive areas.

A total of fifty-four (54) freshwater wetlands with a score of 60+ were delineated within the St. Peters Bay Watershed Complex (Maps 11L/2, 11L/7 and 11L/8), (Canadian Wildlife Service, n.d.).

9.2 Coastal Wetlands

Coastal wetlands were classified and scored as coastal units. The coastal unit score was calculated using the total of the scores from six component types of wetlands along with five additional factors. Added to that was a value for the disturbance status of the unit. The total coastal unit score indicated its productivity and provides a measure of its importance to wildlife. The scores ranged from 10 to 1500 points and were indicated as the sum of all wetlands within the unit.

There are seven wetlands which can be classified as coastal units within the St. Peters Bay Watershed Complex (Map 11L/7), (Canadian Wildlife Service, n.d.).

9.3 Ducks Unlimited Canada Management Sites

Ducks Unlimited Canada is active on Prince Edward Island in the enhancement and management of wildlife habitat. Several management techniques are employed for this purpose. Installation of water control devices such as drop inlets and stoplog control structures allow for the creation of ponds and the regulation of water levels in order to maintain optimal habitat conditions. Fishways are usually installed with the water level control structures in order to allow for the continued passage of fish into and out of the impoundment.

There are seven active Ducks Unlimited sites (Table 9.1) within the watershed (Dibblee, 1989).

Table 9.1 Ducks Unlimited Sites Located Within the St. Peters Bay Watershed Complex

NAME	SIZE (ha)	SHORELINE (km)	YEAR COMPLETED
MacDonalds Pond	90	3.4	1973
McKenna Marsh	25	1.5	1974
Martinvale (Everglades)	280	8.0	1974
Elliotvale	60	2.0	1977
Marie River	60	2.5	1978
Martinvale (The Sticks)	56	1.5	1984
McCarricks	35	1.7	1984

10.0 ADDITIONAL ACTIVITIES WITHIN THE ST. PETERS BAY WATERSHED COMPLEX

10.1 Hydrometric Stations / Water Chemistry Data

The first streamflow data collected in Prince Edward Island was from the Dunk River at Rogers Mill between 1919 and 1935. Currently, the station at Wall Road on the Dunk River is one of two stations on P.E.I. which have been in operation since 1961. There are three stations located within the St. Peters Bay Watershed Complex for which streamflow data to 1986 is available (Map 11L/7). All are on the Morell River at Morell (NAQUADAT No. 01CD001), Peakes Road (NAQUADAT No. 01CD002) and Bangor (NAQUADAT No. 01CD003).

Land use characteristics for the basins draining to each of these stations have been determined by the Inland Waters Directorate, Environment Canada, Dartmouth, Nova Scotia and appear in Table 10.1. Together, they drain an area of 414.20 km^2.

Table 10.1 Land Use Characteristics of Hydrometric Stations Located Within The St. Peters Bay Watershed Complex

Station Number	Drainage Area (km^2)	Forest Area (km^2)	Cleared Area (km^2)	Swamp Area (km^2)	Pond Area (km^2)	Basin Perimeter (km)	Total Length of Stream (km)	Stream Gradient (%)	Period of Record
01CD001	134.80	85.40	43.80	4.90	0.649	67.60	113.80	0.24	1919-1921
01CD002	130.60	82.30	42.70	4.90	0.649	67.60	110.30	0.25	1961-1979
01CD003*	148.80	92.80	50.30	5.09	0.639	68.50	120.70	0.22	1964-PRESENT

* ACTIVE

In addition, the Water Quality Branch, Inland Waters Directorate, Environment Canada, Moncton, New Brunswick also maintains somewhat limited data associated with the following studies:

- P.E.I. Groundwater Study (May 1972 - September 1973);
- P.E.I. Surface Water Quality Survey (July 1972);
- Water Quality Board National Water Quality Monitoring (April 1974 - March 1978); and the
- Toxic Chemical Survey (1985).

Parameters monitored included the following: major ions, physical parameters, nutrients, metals and toxic substances.

10.2 Morell River Management Co-Op

The Morell River Management Co-Op Incorporated is the operational wing of the Morell and Area Land Use Steering Committee which was formed 1972 (Guignon, 1989). The Co-Op coordinates a three-tiered joint (municipal, provincial and federal) approach to the management of the Morell River subwatershed.

Projects undertaken by the Co-op include fish and wildlife censuses, pond and stream improvements and fish hatchery operations. The Morell River Conservation Zone, which the Co-Op helped establish, extends for a distance of three chains (60 metres) on either side of the River extending from the Village of Morell to Leards and Cranes Ponds.

10.3 Morell River Surface Water Program Demonstration Project

As part of the Surface Water Program a freshwater spring on the banks of the Morell River was tapped using a length of PVC pipe. Its purpose is to lower the temperature of a pool on the River in order to make it more suitable for salmonids. As part of the project three sites were electrofished to assess the effectiveness of the tap. Cross sections of the River were also carried out to determine the success of the installation of a series of gabions and other fish habitat improvement structures.

10.4 St. Peters Bay Economic Development Strategy 1989

This study was sponsored by the Village of St. Peters as an economic profile of the section of the watershed which lies between between the villages of St. Peters and Morell. The project adopted the view that the area is a distinct regional unit that can rely on the effective use of the resource base within the watershed to achieve economic and social stability. The report contains a variety of useful statistical and interpretive information largely outside the scope of the Watershed Inventory Project.

11.0 ACTIVITIES AFFECTING SURFACE WATER RESOURCES WITHIN THE ST. PETERS BAY WATERSHED COMPLEX

Many of the problems affecting surface water resources within the St. Peters Bay Watershed Complex occur as a result of the high erodibility of Island soils. Soil erosion is accelerated by poor agricultural, forestry and road maintenance and construction practices. The problems affecting surface water resources on P.E.I. can be placed into three general categories; sedimentation (siltation) sources, pollution point sources and instream obstructions.

11.1 Sedimentation (Siltation) Sources

The entry of soil into surface waterways is described by the Watershed Inventory Project as a sedimentation (siltation) source. Autumn tillage, particularly plowing with the slope and cultivation excessively close to the streams' edge, often results in extensive landwash and siltation of the Island's waterways. Improper forestry operations, such as clearcutting on steep slopes and removal of greenbelts along streams and rivers also provides for sedimentation of streams and rivers.

One of the major sources of siltation to Island waterways is caused by the construction and maintenance of P.E.I. roads. Many roads on the Island are unpaved which presents numerous potential sources of sedimentation. Improper grading of these

roads, in particular, leaving a ridge of clay and sand at either edge allows runoff water to form channels resulting in erosion to the road surface. Water usually flows alongside these ridges until it "breaks" through, usually at a road-stream intersection. This practice of grading also renders ditches, if present, useless.

Silt-loading of Island streams and rivers does not usually affect the waterway at the point of entry but its effects are impacted further downstream. Soil particles are carried by currents and deposited in the stream covering essential finfish spawning areas. Shellfish beds within the estuaries are also smothered by silt.

11.1.1 48 Road

An abandoned shale pit with unstabilized banks, located above an unnamed tributary of the Morell River (Map 11L/7), represents a potential siltation source to the River.

11.1.2 Indian Bridge

Erosion from the roadbed at this location (Map 11L/7) into an unnamed tributary of the Morell River constitues a siltation source.

11.1.3 Route #329 I

There are not any ditches on this unpaved road for a distance of 2.5 kilometres (Map 11L/7). This allows for the formation of gullies as water runoff is carried along the road until it eventually breaks through and enters a stream thereby constituting a sedimentation source.

11.1.4 Route #329 II

The banks at this road-stream intersection (Map 11L/7) are steeply sloped and heavily eroded. The downstream side of this unnamed tributary of the Morell River has prominent siltbeds due to the lack of ditches and erosion of this poorly constructed crossing.

11.1.5 Corraville

The banks at this road-stream intersection (Map 11L/7) are steeply sloped and heavily eroded. The downstream side of this unnamed tributary of the Morell River has prominent siltbeds resulting from the erosion of this poorly constructed crossing.

11.1.6 Farmington

The stream below a bypass pond (Map 11L/8) has been

partially filled in with earth during landscaping activity. This has restricted water flow resulting in the creation of a narrow and shallow stream. Siltbeds have also formed in downstream locations.

11.2 Pollution Point Sources

The entry of non-natural substances into a surface waterway is known as a pollution point source. For example, fertilizer and manure runoff into surface waterways results in bacterial and chemical contamination of the system. Inadequately or improperly treated human sewage, stormwater drainage and the discharge of industrial effluents also contribute to the deterioration of P.E.I.'s surface water quality.

The most recent examples of pollution point sources on the Island have been the entry of petroleum products, specifically gasoline, into streams, rivers and groundwater aquifers. This has resulted from either transportation accidents or leakage from underground storage tanks.

The result of bacterial contamination is usually the eutrophication of the aquatic system. As is the case with siltation, the effects of many pollution point sources are felt in downstream areas. This can, for example, result in the closure of shellfish harvesting areas.

11.2.1 International Seafoods Limited

Washwater with a high biological oxygen demand from operations at the International Seafoods Limited plant in Morell is discharged directly into the Morell River (Map 11L/7) without receiving treatment.

11.2.2 Elliotvale

Stock watering on the Morell River above Route #5 (Map 11L/7), which is somewhat limited by fencing, constitutes a source of bacterial contamination.

11.2.3 Byrnes Road

Stock watering and manure runoff from a pasture represent a bacterial contamination source to an unnamed tributary of the Morell River (Map 11L/7).

11.2.4 Morell East

Stock watering on an unnamed tributary of the Marie River (Map 11L/7) constitutes a source of bacterial contamination.

11.3 Instream Obstructions

Numerous other factors also influence the quality of waterways within the watershed. Fallen trees or other debris in the streams and rivers present problems for fish passage. Improperly installed and unmaintained culverts, insufficient water flow and non-existent or inadequate dam bypass structures not only pose barriers to successful fish passage but also affect the amount of water available for use in downstream areas by other proponents.

11.3.1 Martinvale

The Ducks Unlimited water level control structure at this location on the Morell River (Map 11L/7) has created a shallow, large surface area pond in a region of low water flow. This results in excessive evaporation and warm water problems downstream (Guignon, 1988). Beaver dams created similar problems prior to the construction of the impoundment (Godfrey, 1989).

11.3.2 Pine Brook

A 2.0 metre wooden box culvert under Route #2 (Map 11L/7) is blocked by siltation resulting in a water depth of less than 0.05 metres thereby creating a complete barrier to fish passage.

11.3.3 Windon

An unnamed tributary of the Morell River (Map 11L/7) is choked with alder and scrub and will allow fish passage only during periods of high water.

11.3.4 McKennas Pond

This Pond, located on the West Branch of the Morell River (Map 11L/7), has a drop inlet as its only water exit. Although the structure is in good condition it forms a complete barrier to fish passage.

11.3.5 Elliotvale

A culvert, located at the intersection of Route #5 and the Morell River (Map 11L/7), has debris in the upstream end and represents a partial barrier to fish passage.

11.3.6 Cardross

A beaver barrier, located at this road-stream intersection on the Morell River (Map 11L/7), is partially blocked with debris and presents a problem for successful fish passage.

11.3.7 Marie River Ducks Unlimited Project

The two step pool-and-weir fishway at this location (Map 11L/7) presents a difficult passage for fish. A simple modification (the removal of part of the uppermost weir) would greatly increases its efficiency.

11.3.8 MacDonalds Pond

A temporary water drainage pipe, in use during improvement operations at the Pond, presents a complete barrier to fish passage (Map 11L/7). It has a 0.25 metre drop into a plunge pool that has a depth of only 0.05 metres.

11.3.9 St. Peters

Although the depth of water in this road-stream intersection (Map 11L/7) is adequate, the upstream flow is restricted by debris in the stream and is a partial barrier to fish passage.

11.3.10 Five Houses

A 3.50 metre drop on the downstream side of this road-stream intersection (Map 11L/7) represents a complete barrier to fish passage on an unnamed tributary of St. Peters River.

11.3.11 Farmington I

Erosion of the roadbed into St. Peters River has created siltbeds at this road-stream intersection (Map 11L/8). The crossing represents a complete barrier for fish during periods of low water flow.

11.3.12 Farmington II

A beaver dam, located upstream of a road-stream intersection of the St. Peters River (Map 11L/7), constitutes a complete barrier to fish passage. Erosion of the roadbed into the stream was also noted.

REFERENCES

Aitken, A., Department of Fisheries and Oceans, Charlottetown, written comm., 1989.

Canada Land Inventory, Soil Capability For Agriculture, 1968.

Canadian Wildlife Service, Wetlands Atlas of Prince Edward Island, n.d.

Clough, K., P.E.I. Department of Agriculture, Charlottetown, pers. comm., 1988.

Curley, K., Air and Solid Wastes Branch, P.E.I. Department of the Environment, Charlottetown, pers. comm., 1989.

Curley, K., Air and Solid Wastes Branch, P.E.I. Department of Community and Cultural Affairs, Charlottetown, pers. comm., 1988.

DeHaan, R., P.E.I. Department of Agriculture, Charlottetown, pers. comm., 1989.

Dibblee, R., Biologist, Fish and Wildlife Branch, P.E.I. Department of the Environment, Charlottetown, pers. comm., 1989.

The Guardian - Patriot, September 1, 1988.

Godfrey, A., Biologist, Fish and Wildlife Branch, P.E.I. Department of the Environment, Charlottetown, pers. comm., 1989.

Guignon, D., University of Prince Edward Island, Charlottetown, P.E.I., pers. comm., 1988.

Hogan, S., Public Utilities Commission, Charlottetown, P.E.I., pers. comm., 1988.

Horne, F., S. Knudson, A. Rice and C. Roumbanis, 1988 Scenic Heritage Roads Program - Final Report, Island Nature Trust, Charlottetown, 1988.

Judson, I., P.E.I. Department of Fisheries, Charlottetown, pers. comm., 1989.

MacIntyre, G., Conservation Officer, Fish and Wildlife Branch, P.E.I. Department of the Environment, Charlottetown, pers. comm., 1989.

MacLean, S., Director of Water Safety, Canadian Red Cross Society, Charlottetown, pers. comm., 1989.

Matheson, M., Fisheries and Oceans, Morell, P.E.I., pers. comm., 1989.

McAdam, P., Fisheries and Oceans, Souris, P.E.I., pers. comm., 1989.

Murphy, C., Environmental Management Branch, P.E.I. Department of Community and Cultural Affairs, Charlottetown, pers. comm., 1988.

Murphy, L., Department of Fisheries and Oceans, Charlottetown, written comm., 1989.

Murphy, S., P.E.I. Department of Agriculture, Charlottetown, pers. comm., 1988.

P.E.I. Department of Tourism and Parks, Angling in Prince Edward Island, 1988.

P.E.I. Department of Tourism and Parks, Canoeing in Prince Edward Island, n.d.

P.E.I Department of Tourism and Parks, 1989 Visitors Guide, Charlottetown, 1989.

P.E.I. Development Agency, Marketing Division, Directory of Manufacturing and Proceessing, Charlottetown, 1986.

Pharo, C., Agriculture Canada, Charlottetown, pers. comm., 1989.

Reeves, D., Department of Environment, Charlottetown, P.E.I. pers. comm., 1989.

Rossiter, L., Municipal Administrator for Morell, P.E.I., pers. comm., 1989.

Ryan, A., Municipal Administrator for St. Peters, P.E.I., pers. comm., 1989.

Small, D., Department of Fisheries and Oceans, Ellerslie, P.E.I., pers. comm., 1988.

Taylor, K., Inland Waters Directorate, Environment Canada, Dartmouth, N.S., pers. comm., 1988.

Water Resources Section, P.E.I. Department of Community and Cultural Affairs, Prince Edward Island Active and Abandoned Waste Disposal Site Survey - Phase I, Charlottetown, 1983.

Younie, C., P.E.I. Department of Agriculture, Montague, pers. comm., 1989.

APPENDIX

APPENDIX A

ST. PETER'S BAY WATERSHED DAM INSPECTIONS

Location	Condition/Remarks	UTM Coordinates
MacDonalds Pond I	Breached, no barriers	531300 - 5134800
MacDonalds Pond II	Large, 4 step pool and weir, good condition	531300 - 5133900
MacDonalds Pond III	Breached	531500 - 5131600
Websters Pond	Rock strewn by-pass and relatively low water, but should pass fish. Otherwise, conditions are good.	526400 - 5138300
Farmington I	Small residential pond. Downstream section does not appear suitable as fish habitat.	538800 - 5137200
Farmington II	Wet meadow only. Not suitable as fish habitat.	539300 - 5135600
Quigleys Pond	Small pond with no visible barriers to fish passage. Possible site of old beaver dam.	534900 - 5139000
Pine Brook	2.0 metre box culvert under Hwy. 2 is totally silted in with less than 5 cm of water flow. Complete barrier to fish passage.	531400 - 5139800
Farmington III	Shallow stream and wet below, former beaver dam on site which has been removed (possibly this year; 88). Followed the stream from headwaters to the breached dam site (water level very low; probably too shallow to pass fish in most places).	538300 - 5136300
Tributary	By-pass channel badly choked with alder/shrub growth. May pass fish during periods of high water.	523200 - 5130900
Cranes Pond	Breached	523800 - 5128100
Mooneys Pond	Currently breached. Construction activity underway for a semi-natural rearing facility (DFO).	517600 - 5126700

Location	Condition/Remarks	UTM Coordinates
Pisquid Pond	Small stoplog dam for rice harvesting. Allows fish passage 11 mos./yr. RE: P. Horsley	516500 - 5128400
Martinvale I (Everglades)	Pool and weir fishway (5-step), good condition. DU area (Everglades)	526100 - 5126700
Martinvale II		526100 - 5125400
Lorne Valley	Not observed. Headwater region of river.	525500 - 5124600
Leards Pond	12+ vertical and 1-step pool and weir fishway (new). Also, 1 and 4-step spillways and several older, smaller pool and weir fishways in by-pass channel. Also, pole traps.	522100 - 5127200
MacAuleys Pond	By-pass pond. Low water level in by-pass channel.	522100 - 5123500
McKennas Pond	Drop inlet outflow. Good condition but complete barrier to fish.	522200 - 5122200
Elliotvale	Small fishway is choked with live vegetation and would likely be at least a partial barrier to fish passage. Maybe few fish there anyway! Large cattail marsh in little open water.	517700 - 5122100
48 Road and Rte. 22	Looks like a recent pond caused by farm laneway. Fish noted. Large, submerged culvert outflow and smaller, higher overflow culvert. Fish passage should be OK.	520900 - 5121500
Martinvale "The Sticks"	DU area. Complete barrier to fish passage. Stop-log, drop inlet.	528300 - 5128400